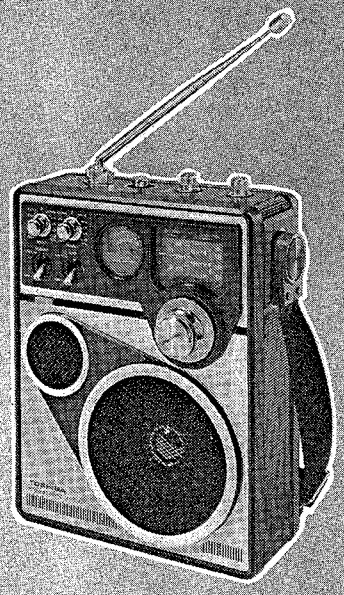
SERVICE DATA
FILE NO.150-107

TOSHIBA

SOLID STATE RADIO

R-1500



SPECIFICATIONS

Frequency Ranges:	LW 150 – 350 kHz MW 520 – 1605 kHz SW1 5.95 – 6.2 MHz SW2 6.2 – 18 MHz FM 88 – 108 MHz	Power Sources:	AC 220V – 240 V 50 Hz ("C" Cell x 4)
Intermediate Frequencies:	LW, MW, SW1, SW2 465 kHz FM 10.7 MHz	Speakers:	100mm PM Dynamic (Woofer) 50mm PM Dynamic (Tweeter)
Power Output:	2 Watts (MAX.)	Dimensions:	Width = 204mm Height = 255mm Depth = 88mm
Antenna:	Ferrite Core, LW & MW Telescopic, SW1, SW2 & FM	Weight:	1.8kg
Jacks:	REC Out jack, Auxiliary jack & Earphone jack		

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OPERATING CONTROLS

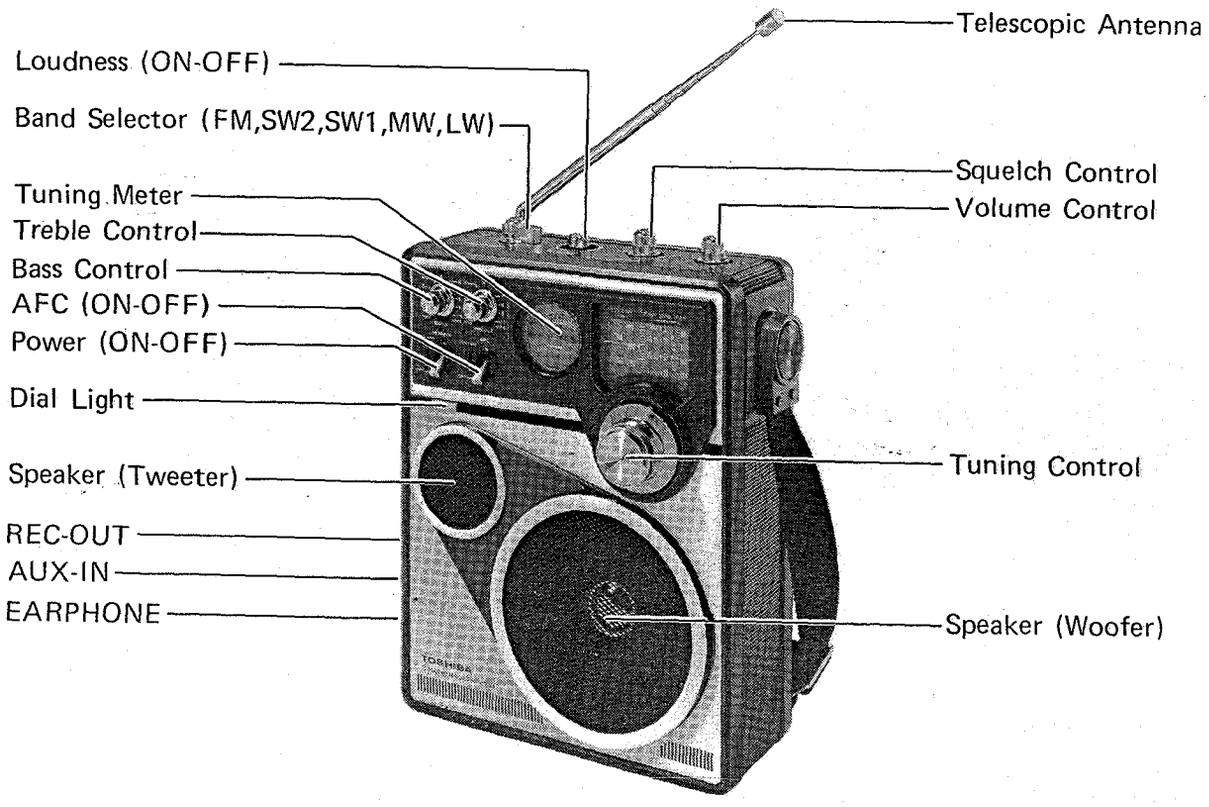


Figure 1.

DISASSEMBLY INSTRUCTIONS

CABINET BACK REMOVEL (Figure 2)

1. Remove the battery cover.
2. Remove the 4 Ⓐ screws and the wire of the telescopic antenna.
3. Separate the cabinet back from the cabinet front.

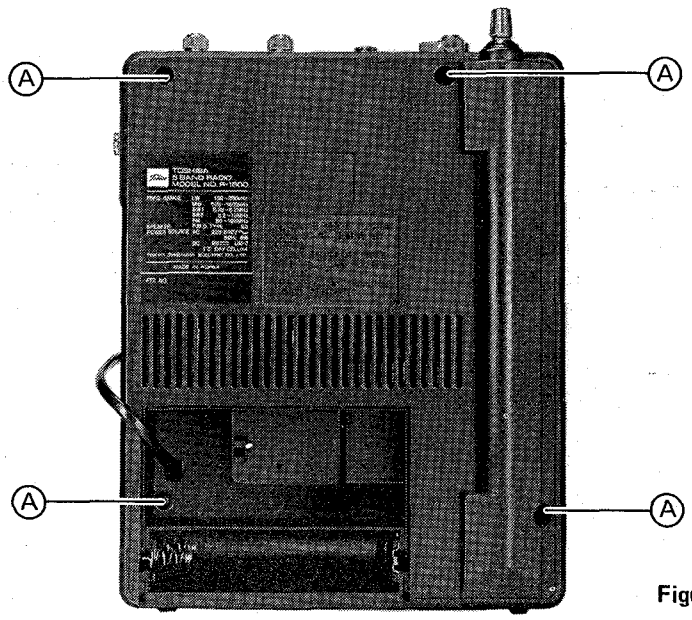


Figure 2.

PC BOARD REMOVEL (Figure 3)

1. Remove the 7 Ⓑ screws.
2. Separate the PC Board from the cabinet front.

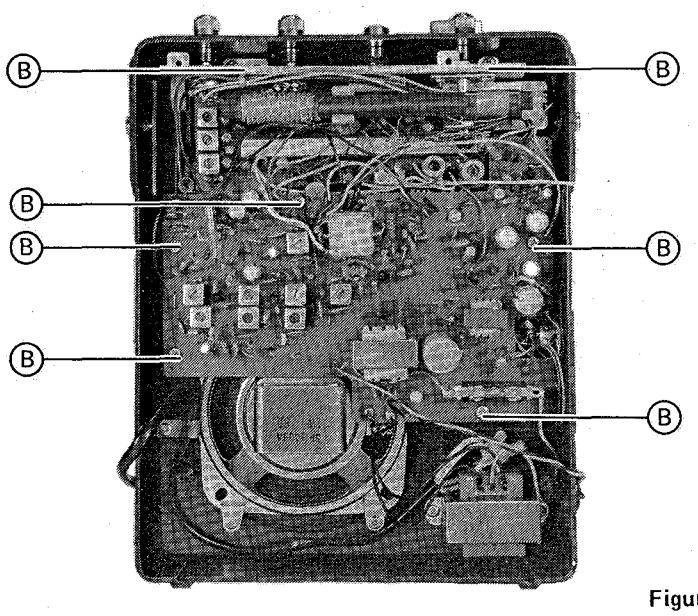
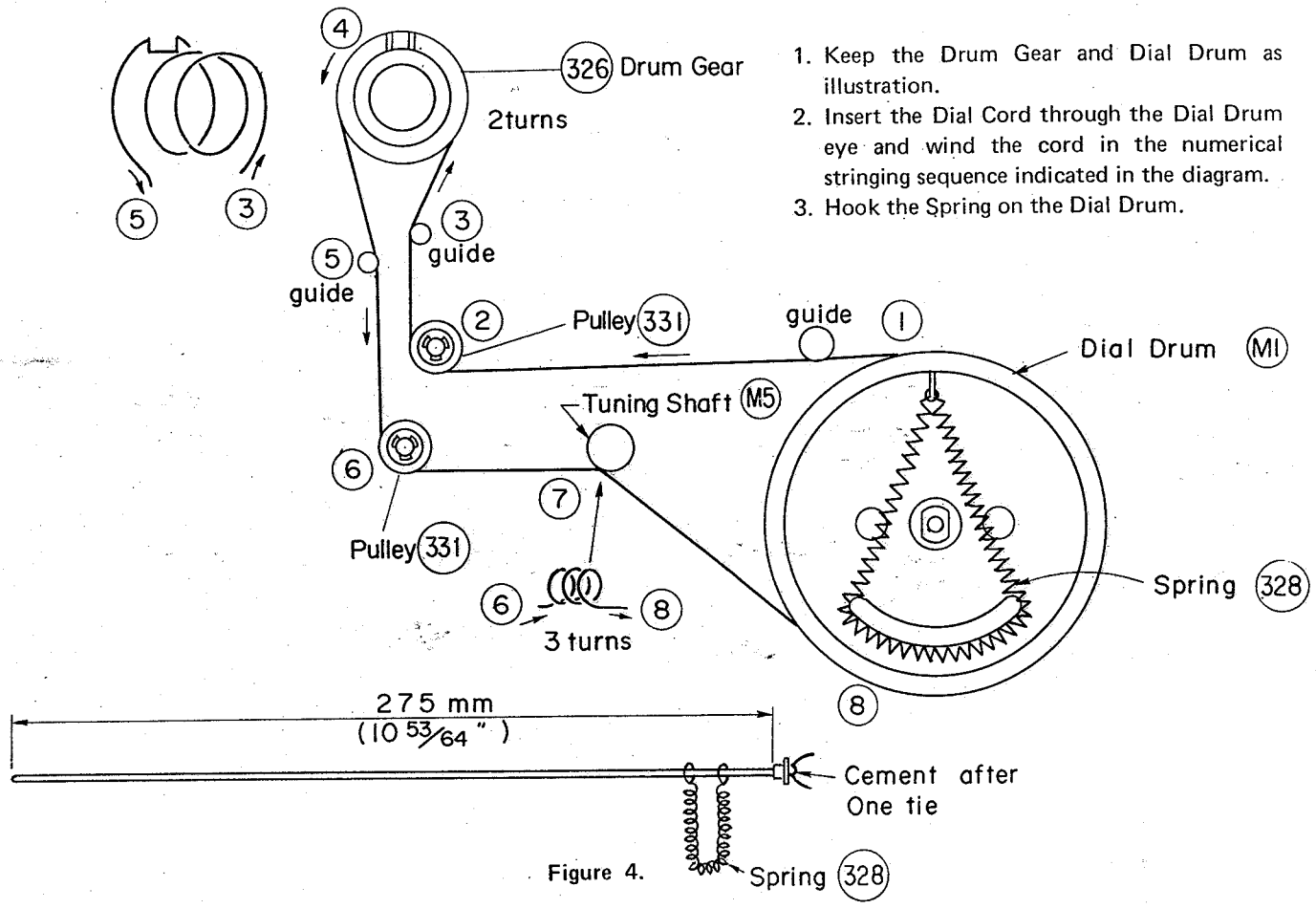


Figure 3.

DIAL STRINGING



1. Keep the Drum Gear and Dial Drum as illustration.
2. Insert the Dial Cord through the Dial Drum eye and wind the cord in the numerical stringing sequence indicated in the diagram.
3. Hook the Spring on the Dial Drum.

Figure 4.

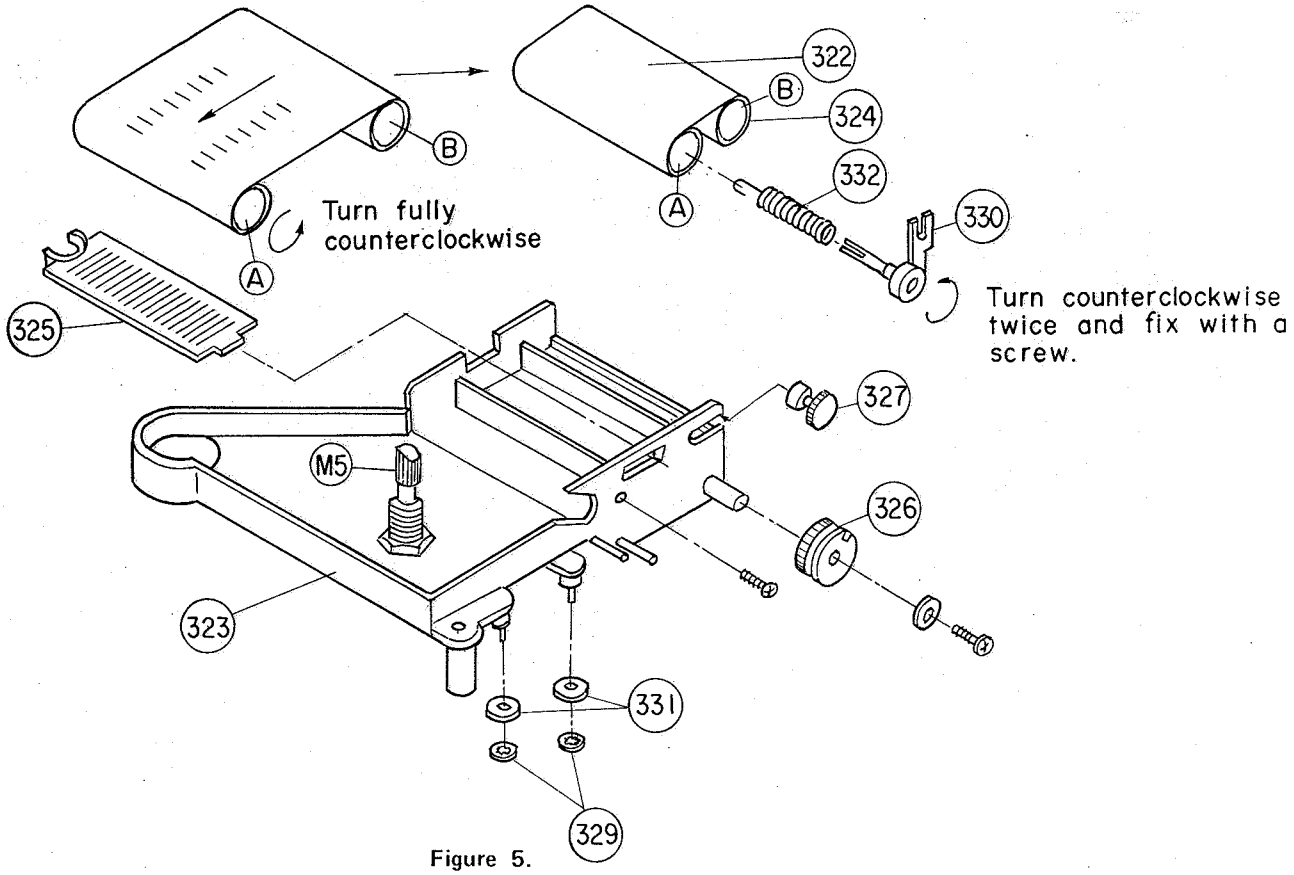


Figure 5.

ALIGNMENT INSTRUCTIONS

TEST EQUIPMENT

1. AM Signal Generator.
2. FM Signal Generator with 10.7MHz marker signal.
3. FM Sweep Generator with a wide band amplifier of approximately 500 kHz, with 10.7MHz marker signal.
4. Oscilloscope with a wide band amplifier of approximately 100 kHz.
5. Test loop – a coil of any size wire with one turn or more.
6. VTVM.
7. 75 ohm dummy antenna.

AM ALIGNMENT

1. Turn on the AM signal generator and the VTVM allowing a fifteen minute warm-up period.
2. Using the test loop across the output of the signal generator, inductively connect the signal generator to the radio.
3. Connect the VTVM across the voice coil or an 8 ohm dummy load.
4. Set selector switch to AM position.
5. Set signal generator frequency as listed in AM ALIGNMENT CHART and maintain a sufficient output level to provide an indication on VTVM.
6. Set volume control at mid-position
7. Proceed as outlined in the IF-LW, MW, SW1 and SW2 ALIGNMENT CHART.

IF-LW ALIGNMENT CHART

Band	Step	Signal Generator Frequency	Radio Dial Setting	Adjustment	Remarks
IF	1	465 kHz	Tuning Gang Closed Lowest Frequency	IT6, 7, 8	Adjust for maximum indication
LW	2	140 kHz	Tuning Gang Closed Lowest Frequency	L8	Adjust for maximum indication
	3	375 kHz	Tuning Gang Open Highest Frequency	TC7	Adjust for maximum indication
	4	Repeat steps 2 and 3 as required.			
	5	160 kHz	Tune to Signal	L5-a	Adjust for maximum indication
	6	350 kHz	Tune to Signal	TC5	Adjust for maximum indication
	7	Repeat steps 5 and 6 as required.			

MW ALIGNMENT CHART

Band	Step	Signal Generator Frequency	Radio Dial Setting	Adjustment	Remarks
MW	1	510 kHz	Tuning Gang Fully Counter-clockwise Lowest Frequency	OSC. coil L9 (MW)	Adjust for maximum indication
	2	1650 kHz	Tuning Gang Fully clockwise Highest Frequency	OSC. Trim. TC8	Adjust for maximum indication
	3	Repeat steps 1 and 2 as required.			
	4	600 kHz	Tune to Signal	Ant. Coil L5-b (MW)	Adjust for maximum indication
	5	1400 kHz	Tune to Signal	Ant. Trim. TC6	Adjust for maximum indication
	6	Repeat steps 4 and 5 as required.			

SW ALIGNMENT CHART

Band	Step	Signal Generator Frequency	Radio Dial Setting	Adjustment	Remarks
SW1	1	5.9 MHz	Tuning Gang Fully Counter-clockwise Lowest Frequency	OSC. Coil L10 (SW1)	Adjust for maximum indication
	2	Repeat step 1 as required.			
	3	6.1 MHz	Tune to Signal	Ant. Coil L6 (SW1)	Adjust for maximum indication
	4	Repeat step 3 as required.			
SW2	1	6.1 MHz	Tuning Gang Fully Counter-clockwise Lowest Frequency	OSC. Coil L11 (SW2)	Adjust for maximum indication
	2	18.5 MHz	Tuning Gang Fully Clockwise Highest Frequency	OSC. Trim. TC4	Adjust for maximum indication
	3	Repeat steps 1 and 2 as required.			
	4	7 MHz	Tune to Signal	Ant. Trim. L7 (SW2)	Adjust for maximum indication
	5	17 MHz	Tune to Signal	Ant. Trim. TC3	Adjust for maximum indication
	6	Repeat steps 4 and 5 as required.			

FM-IF ALIGNMENT

1. Set selector switch to FM position.
2. Turn on both sweep generator and oscilloscope allowing a fifteen minute warm-up period.
3. Connect the RF SWEEP SIGNAL OUTPUT from the signal generator through the loop antenna to the receiver.
4. Connect the oscilloscope vertical input directly to test point TP-3 and connect the shielded lead to chassis ground.
5. Connect the SWEEP VOLTAGE OUTPUT of the sweep generator to the oscilloscope.
6. Proceed as outlined in the FM-IF ALIGNMENT CHART.

FM-IF ALIGNMENT CHART

Step	Signal coupling	Equip.	Tuning	Connection	Adjust. point	Pattern
1	Connect sweep generator output to thru a three-turn 10cm diameter loop antenna.	10.7 MHz center freq. sweep with 10.7 MHz Marker.	Tuning gang fully open	Set scope for connecting output signal from TP-3 to vertical axis of scope "V" and sweep generator output to horizontal axis "H".	IT-1 ~ 5	Adjust for detector S curve as illustrated in Fig. 7.

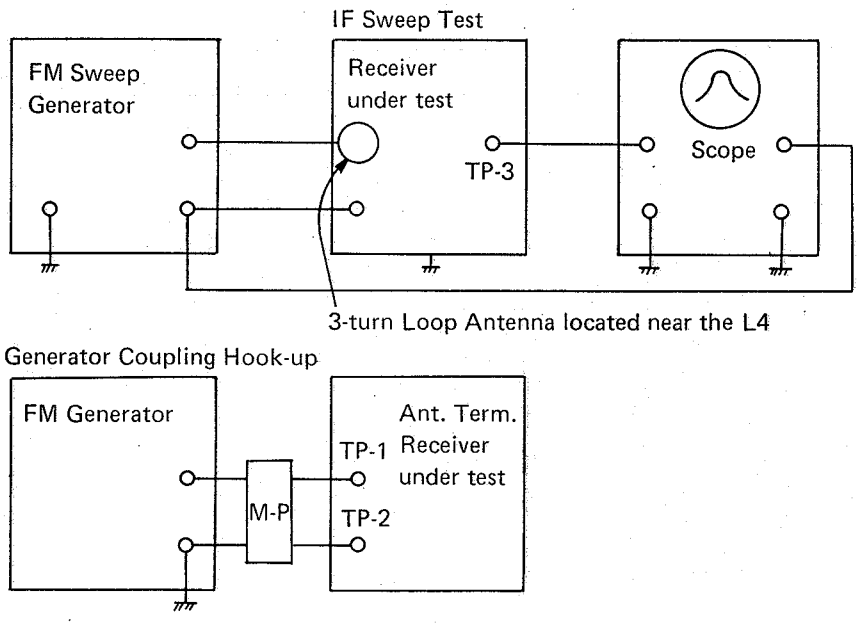


Figure 6.

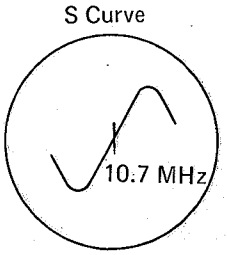


Figure 7.

FM-RF ALIGNMENT

1. Turn on the signal generator and the VTVM, allowing a fifteen minute warm-up period.
2. Connect the signal generator output through a 75 ohm matching plug across TP-1.
3. Connect the VTVM across the voice coil or a 8 ohm dummy load.
4. Set Volume Control to mid-position.
5. Adjust signal generator frequency as indicated in FM-RF ALIGNMENT CHART and maintain a sufficient signal output level to provide a measurable indication.
6. Proceed as outlined in the FM-RF ALIGNMENT CHART.

CAUTION:

When realigning the FM Receiving Frequency, the lowest side of the frequency range must not be below 87.5 MHz in order to comply-with FTZ regulations in West Germany.

FM-RF ALIGNMENT CHART

<table>
<tr><th>Step</th><th>Signal Generator</th><th>Radio Dial Setting</th><th>Adjustment</th><th>Remarks</th></tr>
<tr><td>1</td><td>87.3 MHz</td><td>Tuning Gang Closed
Lowest Frequency</td><td>L4</td><td>Adjust for maximum
output indication</td></tr>
<tr><td>2</td><td>109 MHz</td><td>Tuning Gang Open
Highest Frequency</td><td>TC2</td><td>Adjust for maximum
output indication</td></tr>
<tr><td>3</td><td colspan="4">Repeat steps 1 and 2 as required.</td></tr>
<tr><td>4</td><td>90 MHz</td><td rowspan="2">Tune for signal</td><td>L2</td><td rowspan="2">Adjust for maximum
output indication</td></tr>
<tr><td>5</td><td>106 MHz</td><td>TC1</td></tr>
<tr><td>6</td><td colspan="4">Repeat steps 4 and 5 as required.</td></tr>
</table>

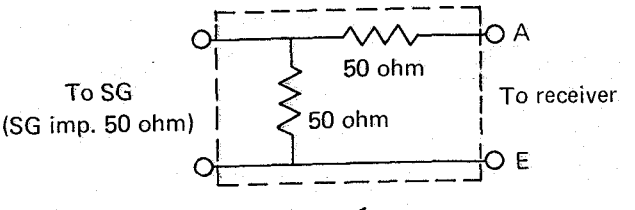


Figure 8.

EXPLODED VIEW

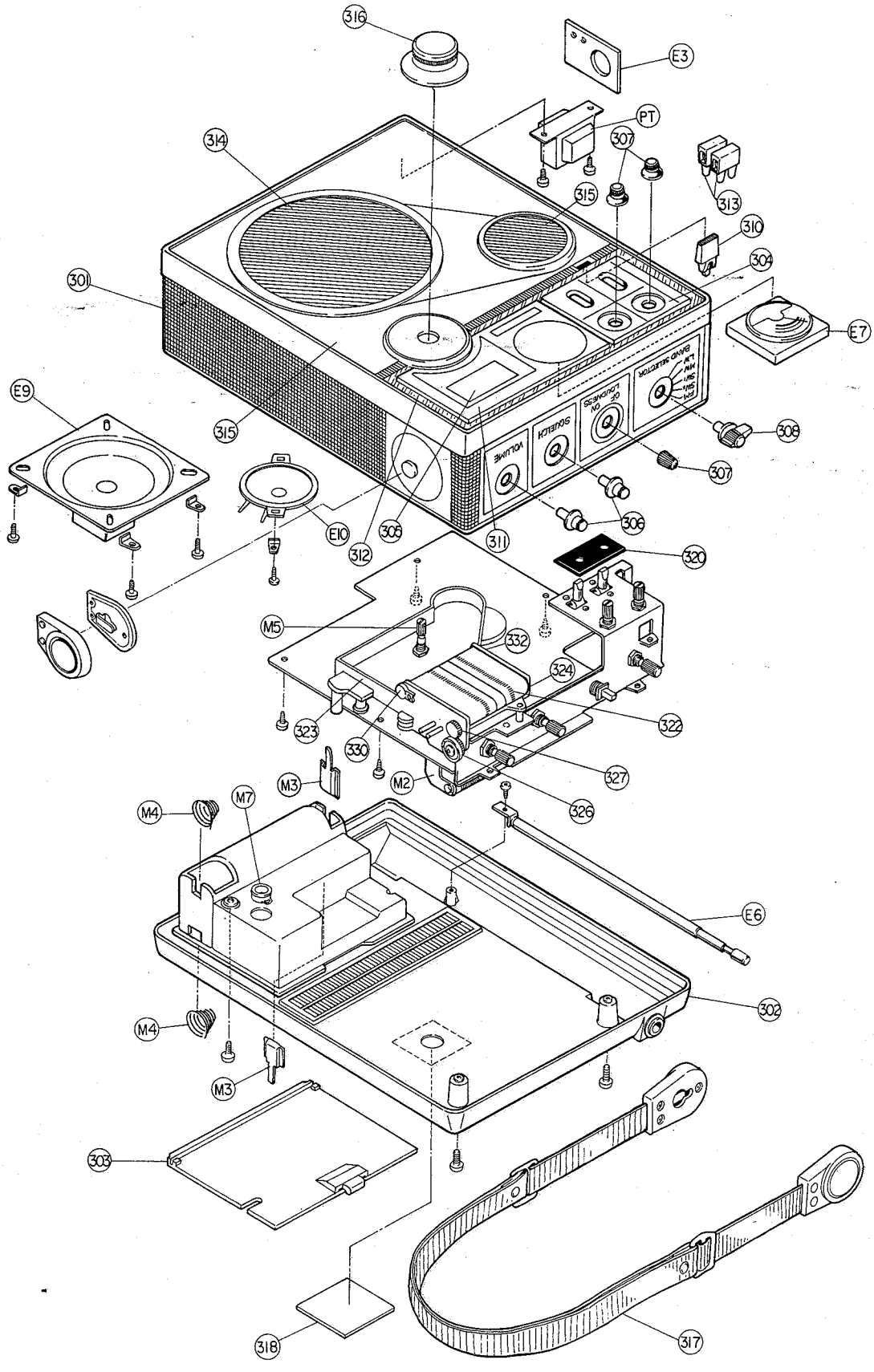


Figure 9.

WIRING

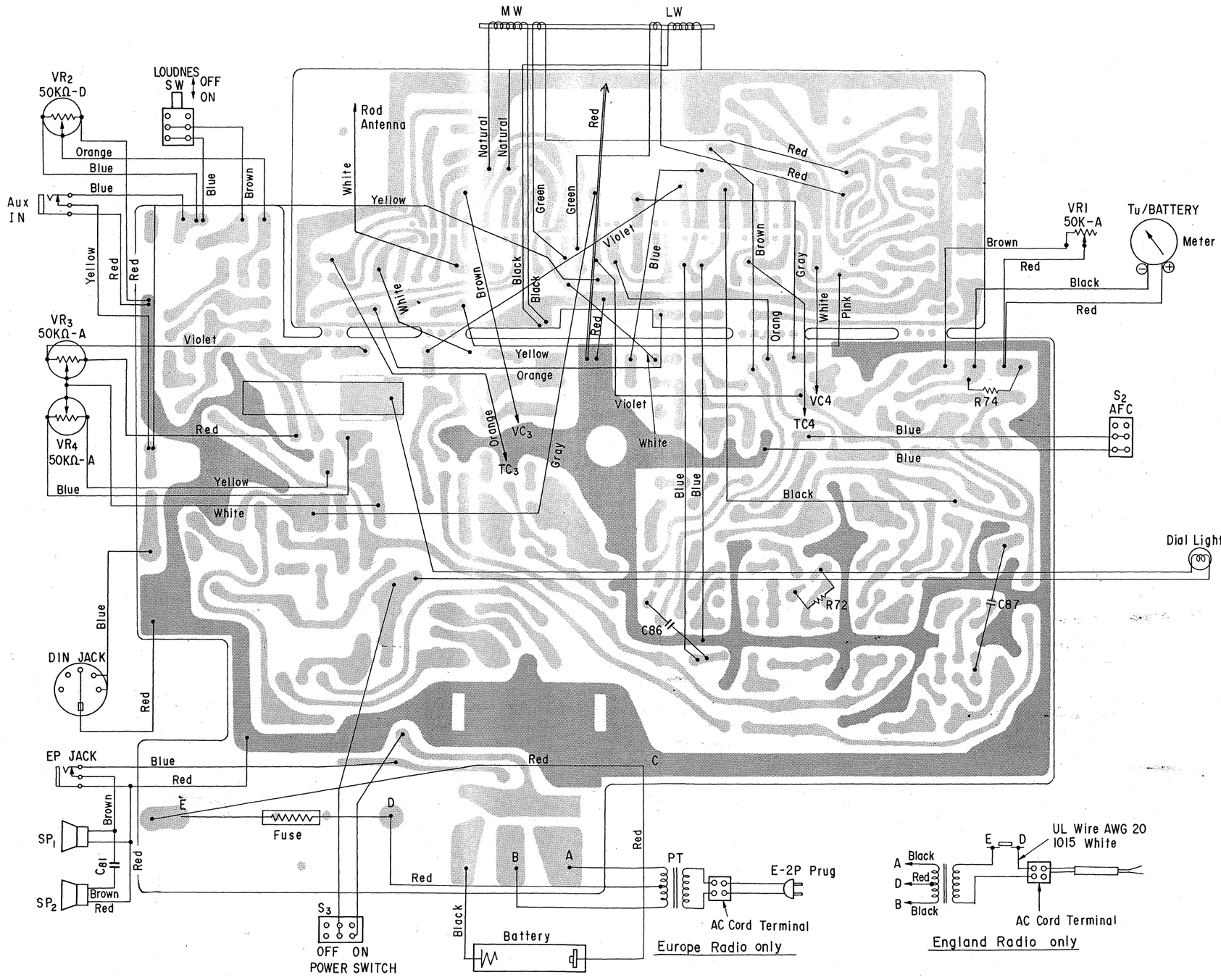


Figure 10.

SCHEMATIC DIAGRAM

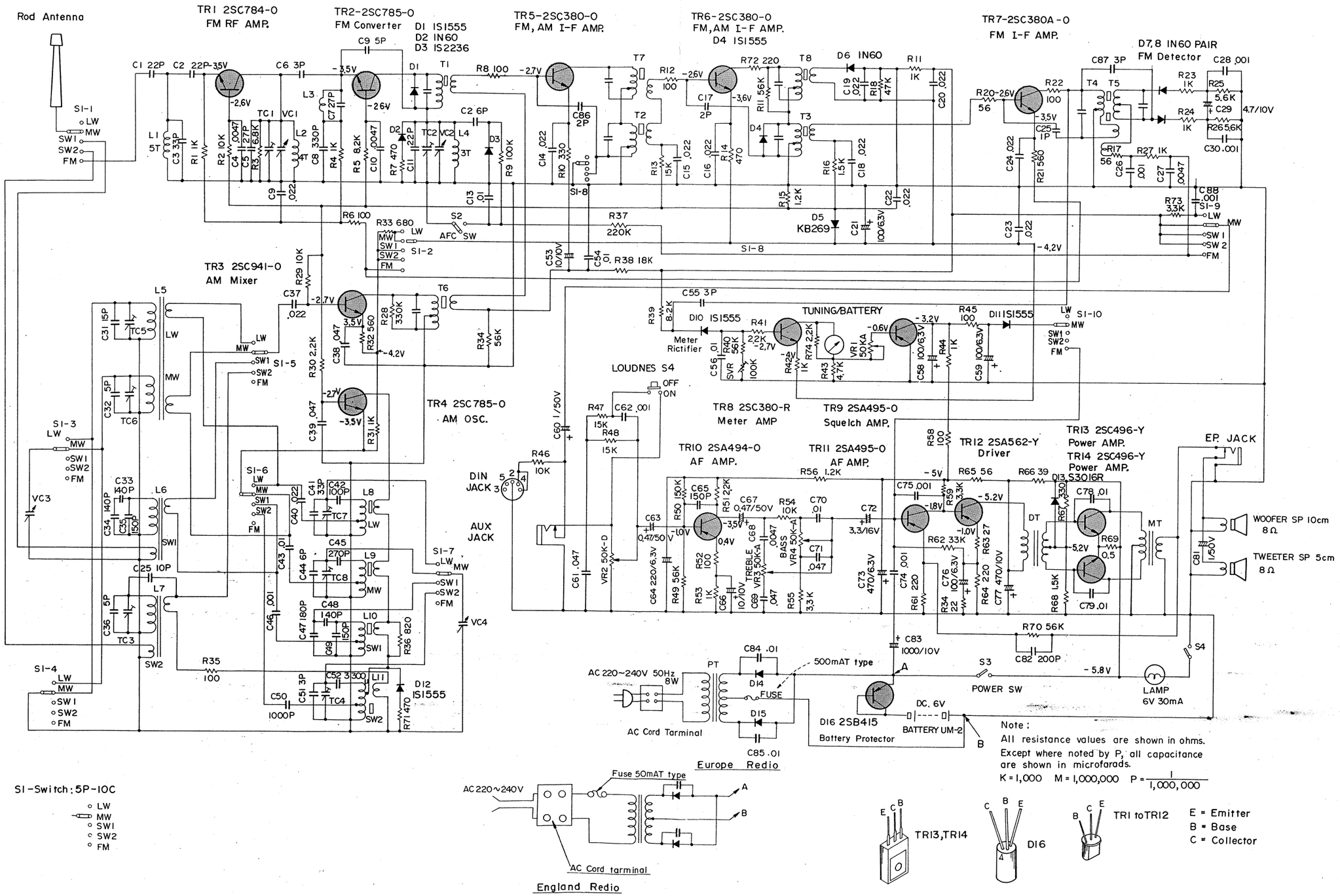


Figure 11.

ELECTRICAL PARTS LOCATIONS

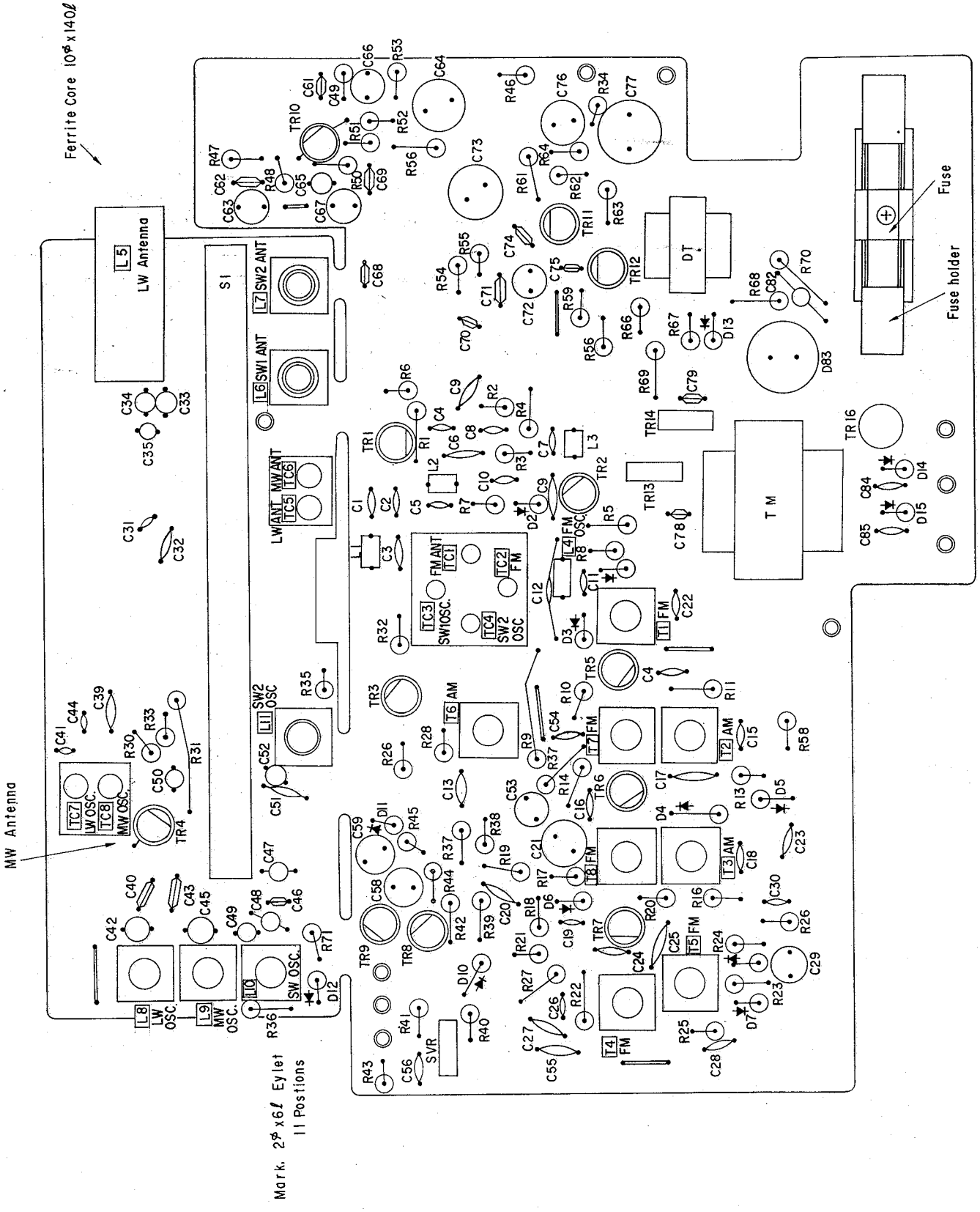


Figure 12. Top View

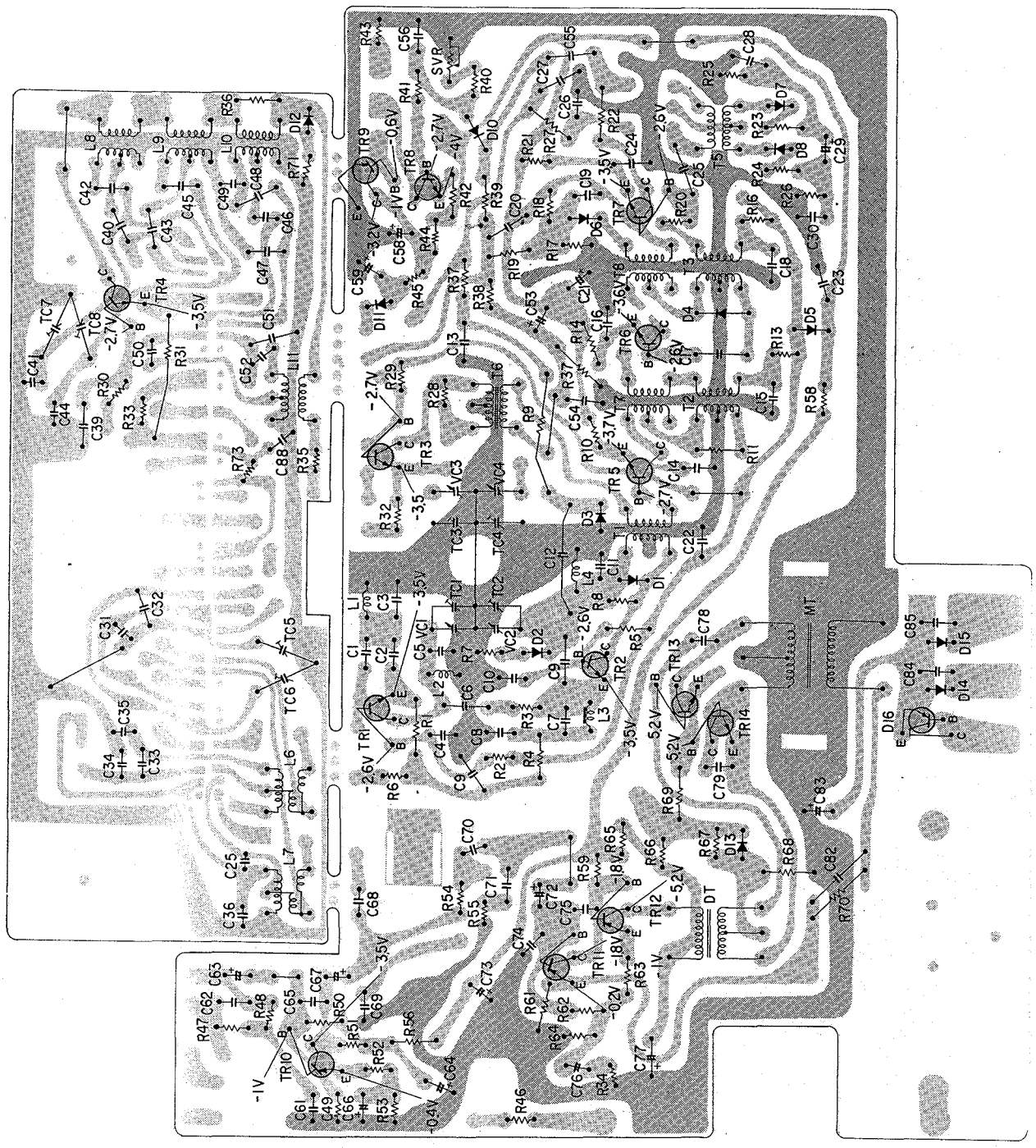


Figure 13. Bottom View

PARTS LIST

Symbol No.	Part No.	Description
	TRANSISTORS & DIODES	
TR1		Transistor, 2SC784-O
TR2,4		Transistor, 2SC785-O
TR3		Transistor, 2SC941-O
TR5,6		Transistor, 2SC380-O
TR7		Transistor, 2SC380A-O
TR8		Transistor, 2SC380-R
TR9,11		Transistor, 2SA495-O
TR10		Transistor, 2SA494-O
TR12		Transistor, 2SA562-Y
TR13,14		Transistor, 2SC496-Y
D1,4,9,10 11,12		Diode, 1S1555
D2,6		Diode, 1N60
D3		Diode, 1S2246
D5	22692017	Diode, KB269
D7,8		Diode, 1N60 Pair
D13		Diode, S-3016R
D14		Diode, 1S1941
D15		Transistor, 2SB415
	COILS & TRANSFORMERS	
L1,2,12	22292042	Coil, Antenna, FM, 5T and Oscillator, FM
L3	22291059	Coil, Choke, FM
L4	22294230	Coil, RF, FM, 4T
L5	22242641	Coil, Antenna, LW, MW
L6,7	22282149	Coil, Antenna, SW1, 2
L8	22205025	Coil, Oscillator, LW
L9	22245173	Coil, Oscillator, MW
L10	22285233	Coil, Oscillator, SW1
L11	22285236	Coil, Oscillator, SW2
T1	22265667	Transformer I-F, FM
T2	22265668	Transformer I-F, FM
T3	22265738	Transformer I-F, FM
T4	22267311	Transformer I-F, FM
T5	22267312	Transformer I-F, FM
T6	22264645	Transformer I-F' AM
T7	22264646	Transformer I-F, AM
T8	22264647	Transformer I-F, AM
DT	22214292	Transformer, Driver
MT	22216251	Transformer, Output
PT	22213494	Transformer Power for Europe & England

Symbol No.	Part No.	Description
	ELECTRICAL PARTS	
E1	22144253	Fuse, 500mA, Mini, Europe only
E1	22144294	Fuse, 50mA, Mini, England only
E2	22167686	Socket, DIN, 5P
E3	22863900	Plate, AUX
E4	22176286	AC Cord, E2ES, Europe only
E4	22176547	AC Cord, BS3, England only
E5	22161287	Cord Connector
E5	22161506	AC Cord Terminal, England
E6	22124682	Telescopic Antenna
E7	22104321	Meter, Tuning
E8	22163084	Jack, Earphone, 3.5ϕ
E9	22151897	Speaker (Woofer)
E10	22151606	Speaker (Tweeter)
E11	22113395	Pilot Lamp
S1	22146227	Switch, Slide Rortary, Band Change
S2,3	22146317	Switch, Slide AFC & Power
S4	22146075	Switch, Push, Loudness
	HARD WEAR	
	22701432	Screw, BID M2.6x8mm
	70432605	Screw, BID M2.6x5mm
	70432006	Screw, BID M2x6mm
	22707044	Screw, BID M2x4mm, Tapping
	22701338	Screw, BID M2.6x8mm, Tapping
	71232610	Screw, BID M2.6x10mm, Tapping
	22701326	Screw, BID M3x8mm, Black
	70442605	Screw, FLT M2.6x5mm
	CAPACITOR	
	D=±0.25pF, J=±5%, K=±10%, M=±20%, Z=-20+80%	
C1	22362220	22pF, J
C2	22362220	22pF, J
C3	22360390	39pF, J
C4	22343472	0.0047μF, Z
C5	22362270	27pF, J
C6	22361309	3pF, D
C7	22362270	27pF, J
C8	22362331	330pF, K
C9	22342223	0.022μF, Z
C10	22343472	0.0047μF, Z
C11	22362220	22pF, J
C12	22361609	6pF, D
C13	22342103	0.01μF, Z
C14	22342473	0.047μF, Z
C15	22343333	0.022μF, Z

Symbol No.	Part No.	Description
C16	22342223	0.022μF, Z
C17	22361109	1pF, D
C18	22342473	0.047μF, Z
C19	22342223	0.022μF, Z
C20	22342223	0.022μF, Z
C21	22442101	100μF, 6.3V, Electrolytic
C22	22342223	0.022μF, Z
C23	22342223	0.022μF, Z
C24	22342223	0.022μF, Z
C25	22361109	1pF, D
C26	22342102	0.001μF, Z
C27	22343472	0.0047μF, Z
C28	22343102	0.001μF, Z
C29	22443479	4.7μF, 10V, Electrolytic
C30	22343102	0.001μF, Z
C31	22362150	15pF, J
C32	22361509	5pF, D
C33	22382151	150pF, J, Polystyrene
C34	22382201	200pF, J, Polystyrene
C35	22382141	140pF, J, Polystyrene
C36	22362150	15pF, J
C37	22342223	0.022μF, Z
C38	22342473	0.047μF, Z
C39	22342473	0.047μF, Z
C40	22373223	0.022μF, M, Mylar
C41	22362330	33pF, J
C42	22382101	100pF, J, Polystyrene
C43	12373103	0.01μF, M, Mylar
C44	22361609	6pF, D
C45	22382271	270pF, J, Polystyrene
C46	22373102	0.001μF, M, Mylar
C47	22382181	180pF, J, Polystyrene
C48	22382151	150pF, J, Polystyrene
C49	22382101	100pF, J, Polystyrene
C50	22382102	1000pF, K, Polystyrene
C51	22361309	3pF, D
C52	22382222	3300pF, K, Polystyrene
C53	22443100	10μF, 10V, Electrolytic
C54	22342103	0.01μF, Z
C55	22361509	5pF, D
C56	22342103	0.01μF, Z
C57	22448479	4.7μF, 50V, Electrolytic
C58	22442101	100μF, 6.3V, Electrolytic
C59	22442101	100μF, 6.3V, Electrolytic
C60	22448109	1μF, 50V, Electrolytic
C61	22373473	0.047μF, M, Mylar
C62	22343102	0.001μF, Z
C63	22448478	0.47μF, 50V, Electrolytic

Symbol No.	Part No.	Description
C64	22442221	2200μF, 6.3V, Electrolytic
C65	22382151	150pF, J, Polystyrene
C66	22442100	10μF, 6.3V, Electrolytic
C67	22448478	0.47μF, 50V, Electrolytic
C68	22373472	0.0047μF, M, Mylar
C69	22373473	0.047μF, M, Mylar
C70	22373103	0.01μF, M, Mylar
C71	22373473	0.047μF, M, Mylar
C72	22445339	3.3μF, 16V, Electrolytic
C73	22442471	470pF, 6.3V, Electrolytic
C74	22373102	0.001μF, M, Mylar
C75	22382151	150pF, J, Polystyrene
C76	22442221	220μF, 6.3V, Electrolytic
C77	22443471	470μF, 10V, Electrolytic
C78	22373103	0.01μF, M, Mylar
C79	22373103	0.01μF, M, Mylar
C80	22373473	0.047μF, M, Mylar
C81	22448109	1μF, 50V, Electrolytic
C82	22382101	100pF, J, Polystyrene
C83	22443102	1000μF, 10V, Electrolytic
C84	22342103	0.01μF, Z
C85	22342103	0.01μF, Z
VC	22308147	Poly-Variable
TC5,6,7,8	22309134	Trimmer

RESISTORS

All resistors are ¼W, ±5%, unless otherwise noted. K=1000

R1	22555102	1K ohm
R2	22555103	10K ohm
R3	22555180	18 ohm
R4	22555102	1K ohm
R5	22555822	8.2K ohm
R6	22555101	100 ohm
R7	22555471	470 ohm
R8	22555104	100K ohm
R10	22555331	330 ohm
R11	22555223	22K ohm
R12	22555427	27 ohm
R13	22555153	15K ohm
R14	22555471	470 ohm
R15	22555122	1.2K ohm
R16	22555152	1.5K ohm
R17	22555104	100K ohm
R18	22555472	4.7K ohm
R19	22555102	1K ohm
R20	22555560	56 ohm
R21	22555561	560 ohm
R22	22555101	100 ohm
R23	22555102	1K ohm
R24	22555102	1K ohm

Symbol No.	Part No.	Description
R25	22555562	5.6K ohm
R26	22555562	5.6K ohm
R27	22555102	1K ohm
R28	22555154	150K ohm
R29	22555103	10K ohm
R30	22555222	2.2K ohm
R31	22555102	1K ohm
R32	22555102	1K ohm
R33	22555271	270 ohm
R34	22555270	27 ohm
R35	22555101	100 ohm
R36	22555821	820 ohm
R37	22555104	100K ohm
R38	22555333	33K ohm
R39	22555482	8.2K ohm
R40	22555104	100K ohm
R41	22555563	56K ohm
R42	22555102	1K ohm
R43	22555472	4.7K ohm
R44	22555392	3.9K ohm
R45	22555101	100 ohm
R46	22555103	10K ohm
R47	22555153	15K ohm
R48	22555154	15K ohm
R49	22555563	56K ohm
R50	22555154	150K ohm
R51	22555392	3.9K ohm
R52	22555270	27 ohm
R53	22555102	1K ohm
R54	22555103	10K ohm
R55	22555682	6.8K ohm
R56	22555122	1.2K ohm
R57	22555332	3.3K ohm
R58	22555101	100 ohm
R59	22555682	6.8K ohm
R60	22555563	56K ohm
R61	22555560	56 ohm
R62	22555333	33K ohm
R63	22555270	27 ohm
R64	22555221	220 ohm
R65	22555560	56 ohm
R66	22555390	39 ohm
R67	22555331	430 ohm
R68	22555152	1.5K ohm
R69	22555508	0.5 ohm
R70	22555563	56K ohm
R71	22555471	470 ohm
R72	22555823	82K ohm
VR1,3,4	22633610	Variable, 17ϕ, 50K ohm-A, Tone, Treble Bass, Squelch
VR2	22626030	Variable, 17ϕ, 50K ohm-D, Volume
SVR	22658185	Semi-Fixed Variable, 50K ohm

Symbol No.	Part No.	Description
		MECHANICAL PARTS
M1	22742565	Dial Drum
M2	22757063	Holder, Antenna, AM
M3	25839186	Contact, Battery
M4	22771355	Spring, Battery
M5	22748182	Tuning Shaft Ass'y
M6	25845120	Bushing, AC Cord
		CABINET PARTS
301	22831474	Front Cabinet
302	22831436	Back Cabinet
303	22832446	Cover, Battery
304	22833273	Dial Grill
305	22837279	Cover, Dial
306	22834910	Knob, VR, SQ
307	22834921	Knob, Tone, Volume
308	22834911	Knob, Band Select
309	22834919	Knob, Push on Weather
310	22834920	Knob, Dial Light
311	22838100	Front Decoration
312	22838098	Plate, Control Decoration
313	22754240	Stopper, AC Cord
314	22843505	Speaker Mesh, Large
315	22843506	Speaker, Mesh, Small
316	22834913	Knob, Tuning
317	22839083	Shoulder Belt
318	22863899	Nameplate, Europe & England
319	22758004	Cushion, Battery
320	22756486	Cover, Switch
321	22864119	Label, Fuse, 500mA, Europe
321	22864120	Label, Fuse, 50mA, England
322	22866128	Film Sheet Dial
323	22837269	Dial Chassis
324	22743183	Shaft
325	22837270	Lens, Lamp
326	22742548	Drum Gear
327	22742549	Gear
328	22771603	Spring, Pulley
329	22703545	Ring CS-2
330	22740527	Stopper
331	22732016	Pulley
332	22771655	Spring, Torsion
		ACCESSORIES
	22954287	Owner's Manual
	22956493	French Tag Card, Europe only
	22950661	Caution Lable, England only
	22152025	Earphone